What is claim d:

1. A receptor comprised of at least one T1R1 polypeptide (or a variant, fragment, or chimera of said T1R1 polypeptide) and/or at least one T1R3 polypeptide (or a variant, fragment, or chimera of said T1R3 polypeptide), wherein said receptor specifically binds to and/or is activated by umami taste stimuli.

2. The receptor of Claim 1 containing a fragment, variant, or chimera of a native hT1R1 polypeptide.

3. The receptor of Claim 1 containing a fragment, variant, or chimera of a native hT1R3 polypeptide.

4. The receptor of Claim 1 wherein said T1R1 and T1R3 are derived from the same species.

5. The receptor of Claim 1 wherein said T1R1 and T1R3 are derived from different species.

6. The receptor of Claim 1 wherein said T1R1 and/or T1R3 are derived from a mammal, fish, reptile, amphibian, or bird.

7. The receptor of Claim 1 wherein said T1R1 and/or T1R3 are from the group consisting of: hT1R1, hT1R3, rT1R1, rT1R3, mT1R1, mT1R3; or fragments, variants, or chimeras derived therefrom.

8. A composition that contains a receptor according to Claim 1.

9. A composition that contains a receptor according to Claim 2.

10. A composition that contains a receptor according to Claim 3.

11. A composition that contains a receptor according to Claim 4.

12. A composition that contains a receptor according to Claim 5.

13. A composition that contains a receptor according to Claim 6.

14. A composition that contains a receptor according to Claim 7.

15. A cell that expresses a receptor comprised of at least one T1R1 polypeptide (or a variant, fragment, or chimera of said T1R1 polypeptide) and/or at least one T1R3 polypeptide (or a variant, fragment, or chimera of said T1R3 polypeptide), wherein said receptor specifically binds to and/or is activated by umami taste stimuli.

16. The cell of Claim 15, which is selected from the group consisting of HEK-293, COS and CHO cells, and Xenopus oocytes.

17. The cell of Claim 15 wherein said T1R1 and T1R3 are of the same species.

18. The cell of Claim 15 wherein said T1R1 and T1R3 are derived from different species.

19. The cell of Claim 15 wherein said T1R1 and/or T1R3 are derived from a mammal, fish, reptile, amphibian, or bird.

20. The cell of Claim 15 wherein said T1R1 and T1R3 are selected from the group consisting of: hT1R1, hT1R3, mT1R1, mT1R3, rT1R1 and rT1R3; or fragments, variants or chimeras therefrom.

21. A receptor comprised of at least one T1R2 polypeptide (or a variant, fragment, or chimera of said T1R2 polypeptide) and/or at least one T1R3 polypeptide (or a variant, fragment, or chimera of said T1R3 polypeptide), wherein said receptor specifically binds to and/or is activated by sweet taste stimuli.

22. The receptor of Claim 21 containing a fragment, variant, or chimera of a native hT1R2 polypeptide.

23. The receptor of Claim 21 containing a fragment, variant, or chimera of a native hT1R3 polypeptide.

24. The receptor of Claim 21 wherein said T1R2 and T1R3 are derived from the same species.

25. The receptor of Claim 21 wherein said T1R2 and T1R3 are derived from different species.

26. The receptor of Claim 21 wherein said T1R2 and/or T1R3 are derived from a mammal, fish, reptile, amphibian, or bird.

27. The receptor of Claim 21 wherein said T1R2 and/or T1R3 are from the group consisting of: hT1R2, hT1R3, rT1R2, rT1R3, mT1R2, mT1R3; or fragments, variants, or chimeras derived therefrom.

28. A composition that contains a receptor according to Claim 21.

29. A composition that contains a receptor according to Claim 22.

30. A composition that contains a receptor according to Claim 23.

31. A composition that contains a receptor according to Claim 24.

32. A composition that contains a receptor according to Claim 25.

33. A composition that contains a receptor according to Claim 26.

34. A composition that contains a receptor according to Claim 27.

35. A cell that expresses a receptor comprised of at least one T1R2 polypeptide (or a variant, fragment, or chimera of said T1R2 polypeptide) and/or at least one T1R3 polypeptide (or a variant, fragment, or chimera of said T1R3 polypeptide), wherein said receptor specifically binds to and/or is activated by sweet taste stimuli.

36. The cell of Claim 35, which is selected from the group consisting of HEK-293, COS and CHO cells, and Xenopus oocytes.

37. The cell of Claim 35 wherein said T1R2 and T1R3 are of the same species.

38. The cell of Claim 35 wherein said T1R2 and T1R3 are derived from different species.

39. The cell of Claim 35 wherein said T1R2 and/or T1R3 are derived from a mammal, fish, reptile, amphibian, or bird.

40. The cell of Claim 35 wherein said T1R2 and T1R3 are selected from the group consisting of: hT1R2, hT1R3, mT1R2, mT1R3, rT1R2 and rT1R3; or fragments, variants or chimeras therefrom.

41. A receptor of Claims 1-7 or 21-27 bound to a solid phase.

42. A receptor of Claims 1-7 or 21-27 in solution.

43. A receptor of Claims 1-7 or 21-27 in a lipid bilayer or vesicle.

44. A method for identifying compounds that modulate taste perception by identifying compounds that bind to, activate, inhibit, enhance and/or modulate one or more of the receptors of Claims 1-7 and/or 21-27.

45. The method of Claim 44 wherein the receptor is bound to a solid phase.

46. The method of Claim 44 wherein the receptor is in solution.

47. The method of Claim 44 wherein the receptor is in a lipid bilayer or vesicle.

48. The method of Claim 44 which uses a receptor-binding assay to identify the said compound.

49. The method of Claim 44 which uses a receptor activity-based assay to identify the said compound.

50. The method of Claim 44 wherein said receptor is expressed in a cell.

51. The method of Claim 50 wherein said cell is a HEK-293, COS, or CHO cell.

52. The method of Claim 50 wherein said compound is identified by its effect on receptor internalization.

53. The method of Claim 50 wherein said compound is identified by its effect on receptor phosphorylation.

54. The method of Claim 50 wherein said compound is identified by its effect on arrestin translocation.

55. The method of Claim 44 which uses an assay for second messengers.

56. The method of Claim 55 wherein the said second messenger is cAMP or IP_3.

57. The method of Claim 50 which uses a voltage-sensitive or calcium-sensitive dye.

58. The method of Claim 50 wherein said cell expresses at least one G protein.

59. The method of Claim 58 wherein said G protein is a promiscuous G protein.

60. The method of Claim 59 wherein said promiscuous G protein is $G_{\alpha 15}$ or $G_{\alpha 16}$.

61. The method of Claim 44 wherein said receptor is expressed using a viral vector.

62. The method of Claim 61 wherein said viral vector is expressed in a mammalian cell.

63. The method of Claim 44 wherein said receptor is produced by in vitro translation.

64. The method of Claim 44 wherein said receptor is isolated in a membrane-bound form.

65. The method of Claim 44 wherein said compound is identified by its effect on G protein activation by said receptor.

66. The method of Claim 44 wherein said compound is identified by its effect on receptor conformation.

67. The method of Claim 66 wherein said conformation change is detected by altered susceptibility to proteolysis.

68. The method of Claim 66 wherein said conformation change is detected by NMR spectroscopy.

69. The method of Claim 66 wherein said conformation change is detected by fluorescence spectroscopy.

70. The method of Claim 44 wherein said compound is identified by its effect on binding of a radioactively or fluorescently labeled ligand to said receptor.

71. The method of Claim 70 wherein displacement of said labeled compound is determined by fluorescence polarization or FRET assay.

72. The method of Claim 44 which is a high-throughput screening assay.

73. The method of Claim 44 wherein receptor activity is linked to a reporter gene.

74. The method of Claim 73 wherein said reporter gene is luciferase, alkaline phosphatase, β-galactosidase, or β-lactamase.

75. The method of Claim 44 wherein said receptor is a constitutively active variant.

76. The method of Claim 44 wherein expression of said receptor is under the control of a constitutive promoter.

77. The method of Claim 44 wherein expression of said receptor is under the control of a regulated promoter.

78. The method of Claim 44 wherein said receptor is fused to a peptide that facilitates surface expression.

79. The method of Claim 78 wherein said peptide is a PDZ-domain-interacting peptide.

80. The method of Claim 44 wherein the effect of said compound on said receptor is predicted based on the X-ray crystal structure of said receptor.

81. The method of Claim 44 wherein said compound is identified by its effect on a non-human animal expressing native or transgenic T1R receptors.

82. The method of Claim 81 wherein said compound is identified by its effect on behavior.

83. The method of Claim 81 wherein said compound is identified by its effect on taste receptor cells.

84. The method of Claim 81 wherein said non-human animal is a mouse, rat, worm, fish, or insect.

85. The method of Claim 44 wherein said compound is identified by its effect on a yeast cell expressing said receptor.

86. The method of Claim 44 wherein said compound is identified from a combinatorial library of compounds.

87. The method of Claim 44 wherein said compound is identified from a peptide library.

88. The method of Claim 44 wherein said compound is identified from a randomized library of small molecules.

89. A method of modifying taste sensation in an animal using compounds identified according to Claim 44.

90. The method of Claim 89 wherein said taste sensation is umami taste.

91. The method of Claim 89 wherein said taste sensation is sweet taste.

92. The method of Claim 89 wherein said animal is a human, dog, cat, fish, cow, sheep, or pig.

93. The method of Claim 89 wherein said compound is formulated in a food, beverage, or oral pharmaceutical composition.

94. A method of quantifying the taste of individual compounds or food or beverage compositions using one or more of the receptors of Claims 1-7 and/or 21-27.

95. A cell that stably expresses a receptor comprised of at least one T1R1 polypeptide or a variant, fragment, or chimera of said T1R1 polypeptide and/or at least one T1R3 polypeptide or a variant, fragment, or chimera of said T1R3 polypeptide, wherein said receptor specifically binds to and/or is activated by umami taste stimuli.

96. The cell of Claim 95, which is selected from the group consisting of HEK-293, COS and CHO cells, and Xenopus oocytes.

97. The cell of Claim 95 wherein said T1R1 and T1R3 are of the same species.

98. The cell of Claim 95 wherein said T1R1 and T1R3 are derived from different species.

99. The cell of Claim 95 wherein said T1R1 and/or T1R3 are derived from a mammal, fish, reptile, amphibian, or bird.

100. The cell of Claim 95 wherein said T1R1 and T1R3 are selected from the group consisting of: hT1R1, hT1R3, mT1R1, mT1R3, rT1R1 and rT1R3; or fragments, variants or chimeras thereof.

101. The cell of Claim 95 which is an HEK-293 cell that stably expresses $G_{\alpha 15}$.

102. A composition that contains a cell according to Claim 95.

103. A composition that contains a cell according to Claim 96.

104. A composition that contains a cell according to Claim 97.

105. A composition that contains a cell according to Claim 98.

106. A composition that contains a cell according to Claim 99.

107. A composition that contains a cell according to Claim 100.

108. A composition that contains a cell according to Claim 101.

109. A cell that stably expresses a receptor comprised of at least one T1R2 polypeptide or a variant, fragment, or chimera of said T1R2 polypeptide and/or at least one T1R3 polypeptide or a variant, fragment, or chimera of said T1R3 polypeptide, wherein said receptor specifically binds to and/or is activated by sweet taste stimuli.

110. The cell of Claim 109, which is selected from the group consisting of HEK-293, COS and CHO cells, and Xenopus oocytes.

111. The cell of Claim 109 wherein said T1R2 and T1R3 are of the same species.

112. The cell of Claim 109 wherein said T1R2 and T1R3 are derived from different species.

113. The cell of Claim 109 wherein said T1R2 and/or T1R3 are derived from a mammal, fish, reptile, amphibian, or bird.

114. The cell of Claim 109 wherein said T1R2 and T1R3 are selected from the group consisting of: hT1R2, hT1R3, mT1R2, mT1R3, rT1R2 and rT1R3; or fragments, variants or chimeras therefrom.

115. The cell of Claim 109 which stably expresses hT1R2, hT1R3 and a $G_{\alpha 15}$.

116. A method for identifying compounds that modulate taste perception by identifying compounds that bind to, activate, inhibit, and/or modulate a receptor expressed by a cell that stably expresses at least one T1R.

117. The method of Claim 116 wherein the cell is bound to a solid phase.

118. The method of Claim 117 wherein the cell is in solution.

119. The method of Claim 117 which uses a receptor-binding assay to identify the said compound.

120. The method of Claims 116 wherein said cell is according to any one of Claims 95-101 or 109-115.

121. The method of Claim 116 which uses a receptor activity-based assay to identify the said compound.

122. The method of Claim 116 wherein said T1R receptor is expressed in a cell.

123. The method of Claim 116 wherein said cell is a HEK-293, COS, or CHO cell.

124. The method of Claim 116 wherein said compound is identified by its effect on receptor internalization by said cell.

125. The method of Claim 116 wherein said compound is identified by its effect on receptor phosphorylation.

126. The method of Claim 116 wherein said compound is identified by its effect on arresting translocation.

127. The method of Claim 116 which uses an assay for second messengers.

128. The method of Claim 127 wherein the said second messenger is cAMP or IP_3.

129. The method of Claim 116 which uses a voltage-sensitive or calcium-sensitive dye.

130. The method of Claim 116 wherein said cell expresses at least one G protein.

131. The method of Claim 130 wherein said G protein is a promiscuous G protein.

132. The method of Claim 131 wherein said promiscuous G protein is $G_{\alpha 15}$ or $G_{\alpha 16}$.

133. The method of Claim 116 wherein said receptor is stably expressed using a viral promoter.

134. The method of Claim 116 wherein said cell is a mammalian cell.

135. The method of Claim 116 wherein said compound is identified by its effect on G protein activation by said receptor.

136. The method of Claim 116 wherein said compound is identified by its effect on receptor conformation.

137. The method of Claim 136 wherein said conformation change is detected by altered susceptibility to proteolysis.

138. The method of Claim 136 wherein said conformation change is detected by NMR spectroscopy.

139. The method of Claim 136 wherein said conformation change is detected by fluorescence spectroscopy.

140. The method of Claim 136 wherein said compound is identified by its effect on binding of a radioactively or fluorescently labeled ligand to said stably expressed receptor.

141. The method of Claim 140 wherein displacement of said labeled compound is determined by fluorescence polarization or FRET assay.

142. The method of Claim 116 which is a high-throughput screening assay.

143. The method of Claim 116 wherein receptor activity is linked to a reporter gene.

144. The method of Claim 143 wherein said reporter gene is luciferase, alkaline phosphatase, β-galactosidase, or β-lactamase.

145. The method of Claim 140 wherein said receptor is a constitutively active variant.

146. The method of Claim 140 wherein expression of said receptor is under the control of a constitutive promoter.

147. The method of Claim 140 wherein expression of said receptor is under the control of a regulated promoter.

148. The method of Claim 140 wherein said receptor is fused to a peptide that facilitates surface expression.

149. The method of Claim 140 wherein said peptide is a PDZ-domain-interacting peptide.

150. The method of Claim 140 wherein the effect of said compound on said receptor is predicted based on the X-ray crystal structure of said receptor.

151. The method of Claim 116 wherein said compound is identified by its effect on a yeast cell expressing said receptor.

152. The method of Claim 116 wherein said compound is identified from a combinatorial library of compounds.

153. The method of Claim 116 wherein said compound is identified from a peptide library.

154. The method of Claim 116 wherein said compound is identified from a randomized library of small molecules.

155. A method of modifying taste sensation in an animal using compounds identified according to Claim 116.

156. The method of Claim 155 wherein said taste sensation is umami taste.

157. The method of Claim 155 wherein said taste sensation is sweet taste.

158. The method of Claim 155 wherein said animal is a human, dog, cat, fish, cow, sheep, or pig.

159. The method of Claim 155 wherein said compound is formulated in a food, beverage, or oral pharmaceutical composition.

160. A method of quantifying the taste of individual compounds or food or beverage compositions using a cell that stably expresses a heterologous nucleic acid sequence encoding at least one T1R according to one of Claims 1-7 or 15-21.

161. A cell line which inducibly expresses the human T1R1/T1R3 umami taste receptor or the T1R2/T1R3 sweet taste receptor.

162. The cell line of claim 161 which the cell line is a CHO, COS, HEK or BHK cell line.

163. The cell line of claim 162 which is an HEK-293 cell line.

164. The cell line of claim 161 which expresses a G protein.

165. The cell line of claim 164 wherein said G protein in $G\alpha_{15}$ or $G\alpha_{16}$.

166. The cell line of claim 161 which stably expresses said T1R1/T1R3 receptor.

167. The cell line of claim 161 wherein the expression is induced by the GeneSwitch protein.

168. A method of using the cell line of claim 161 to identify a compound that agonizes or antagonizes the T1R1/T1R3 receptor or T1R2/T1R3 receptor.

169. The method of claim 168 which is a binding assay.

170. The method of claim 168 which is a high throughput screening assay.

171. The method of claim 168 which is fluorometric assay.

172. The method of claim 168 which screens for a compound that competes with L-glutamate or L-aspartate for binding to the T1R1/T1R3 umami taste receptor.

173. The method of claim 168 which is a high throughput screening assay that uses automated fluorometric imaging instrumentation.

174. The method of claim 168 which is used to screen a compound library for compounds that enhance or modulate the activity of L-glutamate to activate the T1R1/T1R3 umami taste receptor.

175. The method of claim 168 which is used to screen a compound library for compounds that agonize or antagonize the T1R2/T1R3 sweet taste receptor.

176. The method of claim 168 which screens for a compound that competes with IMP, GMP or their analogues for binding to the T1R1/T1R3 umami taste receptor.

177. The method of claim 168 which is used to screen a compound library for compounds that mimic the activity of IMP, GMP or their analogues that enhance the activity of a T1R1/T1R3 agonist.

178. The method of claim 168 which is used to screen a compound library for compounds that enhance or modulate the activity of a sweetener to activate the T1R2/T1R3 sweet taste receptor.

179. A method of inhibiting the T1R1/T1R3 umami taste receptor comprising contacting said receptor with a sweet-taste inhibitor that also inhibits both the T1R1/T1R3 sweet taste receptor and the T1R2/T1R3 taste receptor.

180. The method of claim 179 wherein said inhibitor is lactisole.

181. A method for identifying compounds that modulate the T1R1/T1R3 umami taste receptor by screening for compounds that compete with lactisole for binding to and/or inhibiting the T1R1/T1R3 umami taste receptor.

182. The method of claim 179 which is a cell-based assay.

183. The method of claim 182 wherein said assay uses a cell line that co-expresses T1R1 and T1R3.

184. The method of claim 183 wherein said cell line is a HEK-$G\alpha_{15}$ cell line.

185. The method of claim 183 wherein said cell line stably expresses said receptors.

186. The method of claim 183 wherein said cell line transiently expresses said receptors.

187. The method of claim 186 wherein said G-protein is $G\alpha_{15}$ or $G\alpha_{16}$.

188. The method of claim 181 which is a cell-based assay.

189. The method of claim 188 wherein said assay uses a cell line that co-expresses T1R1 and T1R3.

190. The method of claim 189 wherein said cell line is a HEK-$G\alpha_{15}$ said cell line.

191. The method of claim 189 wherein said cell line stably expresses said receptors.

192. The method of claim 191 wherein said cell line transiently expresses said receptors.

193. The method of claim 192 wherein said G-protein is $G\alpha_{15}$ or $G\alpha_{16}$.